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A STUDY OF CALF DISEASES*

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I was very fortunate this year in receiving a grant from E.C.A. (Marshall Aid) which permitted me to visit the United States and while there I studied veterinary schools and research institutes, about 30 in all. One of the main reasons for my visit was to investigate the problem of the diseases of calves and the research work carried out in connection with them.

I need not remind this audience that the problems associated with diseases of newly born calves constitute one of the most serious problems for the veterinary profession and cause enormous losses to the farming community. In many cases these losses are sufficient to reduce and sometimes destroy the normal profit on a dairy farm. In the past, dairy farmers in the West of Scotland were satisfied if they reared a sufficient number of heifer calves to allow them to exercise reasonable culling in selecting replacements for their dairy stock. Most dairy farms were self-supporting and there was no established market for surplus heifers from commercial stocks. Quite a different picture, of course, was shown in the high-grade pedigree stocks in which heifers and bulls represented a very marketable commodity. The position to-day is quite different and attested heifers, even commercial stock, find a ready market. In spite of vigorous attempts on these farms to control disease in young stock the considerable losses continued. Jordan's figure in the early '30s indicated that the mortality was somewhere between 20 per cent. and 22 per cent. In 1940 Lovell and Hill's figures showed the figure in females to be 5·5 per cent. in the whole of England, 6 per cent. in Northern England and 11·4 per cent. in Scotland, where one in eight heifer calves born alive died. Over a period of years every possible treatment and variation in management has been tried but I know of no group of diseases that is so reluctant to follow any reasonable pattern. In some years the mortality is very slight ; in others, when there appears to be no change in the management, the mortality may be very high and variations from farm to farm in the same district in the same season are quite usual.

Lovell recently gave a very good review on the neo-natal diseases of calves. I find myself very much in accord with his views with regard to causation, particularly his emphasis on the importance of environmental factors. I do not think these factors quite so important with regard to salmonella infection, but even in outbreaks in adult cattle the origin of this type of infection frequently is obscure. Rodents may be a source of infection. They appear to suffer from natural infection, and it should be also borne in mind that salmonella cultures are sometimes used as a method of rodent control. In Ireland, Lamont and Kerr (1939) suggest that calf influenza may be due to a virus and in this case environmental factors appear to play an important part in the development of outbreaks of the disease. Calf diphtheria in this country causes considerable losses but fortunately the sulpha drugs have proved themselves of value in these cases.

My experience in America indicates that with regard to the white scour group of diseases, the problem there is definitely comparable. For instance, in the State of New York in Cornell University Herd the figure for calf losses in 1933 was 20 per cent. (At that time, incidentally, the calves were raised in large groups.) In Michigan the figures in the last 16 years indicated a comparable loss of 7·1 per cent. In Iowa State College, during the last 29 years, 11 per cent. of the female calves died during the first two months. The distribution of calf losses was as follows:—

In Iowa—scours (35 per cent.) ; accidents (12 per cent.) ; pneumonia (2 per cent.). Remainder from miscellaneous causes.

In Cornell—digestive troubles (9·7 per cent.) ; pneumonia (24 per cent.) ; scours (32 per cent.).

The same variation from year to year is seen also in the Michigan State Herd losses: 1935, 14·4 per cent.; 1936, 10·8 per cent.; 1937, 7 per cent.; 1938 to 1943, 6 per cent. to 3 per cent., and in 1944, 10 per cent.

In all these cases the calves died before attaining the age of ten months.

It appears that in this country and in the U.S.A. the most serious disease of calves is the white scour type of illness sometimes associated with pneumonia and I think it is no exaggeration to say that much of the excellent research in calf diseases that has been carried out, both in this country and in the U.S.A., while helping with many of the specific infections in calves, has done little, if anything, to elucidate this white scour problem. Veterinary surgeons in practice, while aware of the ravages of white scour, may not be so familiar with the problem as are those veterinarians engaged in investigation centres. In the absence of adequate scientific knowledge the veterinary practitioner, in many cases, has been powerless to advise the farmer on how to combat the disease and in many instances the farming community have ceased to consult him when an outbreak appears. On discussing the matter with certain farmers I find there has crept in a kind of fatalistic acceptance of these losses as something about which nothing could be done. Many veterinary surgeons, who have used every type of prophylaxis and therapy in calf scours, make few claims for their specificity. Some of the older remedies appear to be of some limited value. A proprietary preparation of bismuth, kaolin and brilliant green enjoyed quite a vogue, but without justifying the appellation "specific." Many veterinary surgeons practised good preventive medicine by advising on general hygiene in relation to housing, bedding, diet and husbandry generally. As all such efforts appeared to be without any immediate improvement it is no wonder that there has been a tendency to accept the losses from these diseases fatalistically.

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During my visit to Stockholm last year I discovered that production of *B. coli* serum from innumerable strains was being carried out at the Serum Institute for the control of white scour. The bacteriologists were very enthusiastic about the results but I understand that the early promises of success have not materialised. I discussed the matter with Dr. Jensen, bacteriologist from Copenhagen Veterinary College, and he assured me that in his country this line of approach has practically been discarded. While in the U.S.A. I discussed calf diseases with Dr. Pounden and Dr. Underwood, of the Beltsville Research Station, with Malmquist at Minnesota, Huffman at East Lansing, Michigan, with Davies at Fort Collins, Leasure and Roderick at Kansas State and with J. A. Baker and Dean Hagan at Cornell: also with many clinicians. I came to the conclusion that this problem is almost identical with ours and that their methods of investigation have covered much of the ground worked in this country, with slightly different emphasis on different diseases. For instance, in Colorado and the Far West, calf diphtheria seems to be a more serious problem than diseases of the scour type, no doubt due to the different types of husbandry in range cattle. Incidentally, the *fusiformis necrophorus* causes very serious losses in livestock in the Western States, manifested as calf diphtheria, foul-of-the foot or necrosis of the liver. I gathered that in some farms in the U.S.A. coccidiosis is quite a serious disease in housed calves; to the best of my knowledge, this disease does not constitute a problem with us until the animals are at grass. One other difference between the two countries was the emphasis on lungworm infestation. There is the usual quota of parasitic infestation but I did not find, in any of the states that I visited, that husk constituted the serious problem that it does in the West of Scotland.

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I will have to summarise very briefly the results of my visit but I would like to mention one or two people whose work on this subject is, I think, of considerable importance.

J. A. Baker at Cornell has isolated from calves with pneumonia (with an infrequent scour syndrome) a virus which, when injected into susceptible calves, will cause a disorder resembling the naturally occurring disease but in a milder form. He has passaged the virus through calves and mice. He considers that the reason for the milder disease may be the fact that in natural infection the virus will be accompanied by secondary invaders while in experimental transmission with filtrate these would be absent. I believe an analogy exists in the transmission of panleucopoenia virus in cats and probably swine influenzal virus in pigs where pure virus gives a milder disease. This worker is also investigating an interesting problem in calves associated with the presence of elementary bodies in the alimentary tract. He discovered that many apparently normal calves in New York State show these bodies and he has some evidence to indicate that these may be of extreme importance in some of the commoner scourges of calves and perhaps adult cattle. He has a herd of cattle that have been kept for several generations at the Rockefeller Institutes in as far as practicable a disease-free environment. These cattle are used in the same way as the disease-free dogs bred by Laidlaw & Dunkin for their research into virus distemper.

It might be interesting to recount the experience of the veterinarians at Minnesota who were responsible for the health of the calves in the Dairy Husbandry Department at the University. Unfortunately I did not meet the chief of the Pathology Department but his assistant, *Dr. Malmquist,* was very helpful in relating to me their experiences with endemic calf diseases. The losses over a period of years had been about 20 per cent. when the Veterinary Division were called in to try to reduce the losses. During the first year the problem was tackled from the dietetic and accessory food factor angle and it was considered that many calves showed an avitaminosis, particularly with regard to A, and less so in respect of B, of nicotinic acid and of vitamin D. Supplementary vitamin concentrates were fed but even when adequate vitamins were given no improvement resulted. The mortality rate remained at the same high level and the method was discarded. Next year, following the success of the treatment of new-born foals with the administration of maternal blood, a scheme was initiated whereby all new-born calves received maternal serum as soon after birth as possible. After an initial improvement the mortality figure gradually crept up and at the end of one year was little better than it had been; accordingly, the method was discontinued. Soon afterwards, without any change in management, diet or treatment, the mortality figure dropped from 20 per cent. to 5 per cent. In this herd the disease was almost entirely the typical white scour, occasional pneumonia, syndrome, *post-mortem* examination showing a *B. coli* bacteraemia in most cases. Animals that survived the scour sometimes developed pneumonia about ten days afterwards. I have selected this example from many similar ones to re-emphasise the unpredictable nature of the course of the disease. So often in the past, investigators have drawn conclusions from inadequate data and have used experimental groups too small to be statistically significant. In a disease where in some cases improvement occurs in the course of an outbreak for no obvious reason, it is extremely difficult to interpret the significance of such improvements unless the number of cases involved is very large. In this outbreak the mortality of 20 per cent. would have been much greater had the veterinarians not been living on the place. As soon as any calf became ill, therapy was administered at once, an attempt was made to ascertain the nature of the associated organism, and suitable chemotherapy was tried. The sulpha drugs appeared to be beneficial in many pneumonic cases but to be of little value in the scour cases. Penicillin was also useful in some pneumonic cases; there appeared to be some evidence that streptomycin was of value in the milder scours.

A great deal of work was carried out by *Cushing* (1948) on vitamin research in calves and he proved that some calves had difficulty in synthesising B and C. He considered that, in some cases, this might be the result of a hereditary factor due to a specific gene. Other workers in vitamins suggested that the factor responsible was vitamin A and a supplement in the form of shark liver oil appeared to prove particularly useful. However, when Udall (1943) conducted a very extensive field experiment over several thousand animals he failed to find vitamin A of any significance in preventing scour, although Moor and Berry (1944) found otherwise in a limited experiment. Udall did find good results with sulphathiazole in the pneumonias of calves although it had to be used with great care, otherwise calves developed anaemia and agranulocytosis. Udall's recommendation for prophylaxis in white scours was to use nurse cows housed in sheds, open to the south, for all calves; therapy was of restricted value once the disease developed.

At Beltsville, Dr. Underwood carried out considerable investigations in calf rearing in the dairy husbandry sec-

tion. Several years ago the mortality had been 37 per cent. and with improvement in management the figure dropped to 20 per cent. and later to 10 per cent. This year the figure is very much less. The calves are housed in a special type of barn facing south with complete protection from the north, and they are not allowed out to pasture until they are between six months and one year old. The house has an open window to the front and passages lead to pens on the south wall. The animals are kept for 21 days in individual pens with low concrete walls and tubular metal gates. The calves do not lie directly on the floor but are raised from it by a series of metal grids which make an air space under the bedding and allow the urine to drain through. It is not necessary to clear these pens out completely more than once a week and, in some cases, even once a fortnight is satisfactory. The windows on the south side can be hooked back to the ceiling. At three weeks old the calves are put into small pens and from six to eight of the same age are kept together. These pens are raised from the floor in a similar manner and the division into the passage holds a series of yokes so that each animal may be tied and fed individually. There is also a ring for a pail and fresh cold water is always available.

Dr. Underwood attaches a good deal of significance to the early complete isolation as it is considered that sometimes serious indigestion may be initiated by the calves sucking each other with consequent swallowing of hair. Whenever the calves were fed a small quantity of grain was placed on the animal's nose to teach it to feed. Some years previously there had been considerable losses from coccidiosis in housed calves and I could not ascertain whether in this lay the origin of the adoption of the method of floor construction mentioned above. I could not find any evidence to indicate that the object of keeping these calves from pastures for such a long period was associated with the presence of lungworm infection of calves at pasture.

Dr. Hagan, Dean of the New York State Veterinary College at Cornell University, has carried out considerable investigation on white scours, and the ordinary *B. coli* certainly appears to be involved in many of his outbreaks. In some cases tissues were teeming with the organisms even prior to death. In the very acute form of the disease, the calf shows weakness and drowsiness and may die from a septicaemic form. On most farms, the history is of severe diarrhoea, of white-coloured faeces frequently full of bubbles. After what is usually a short course, the animal dies or recovers but occasionally chronic cases appear and always remain unthrifty. Some of the less acute cases also develop a pneumonia but this can develop independently. The disease does not tend to be serious in small steadings with a few calves but assumes epidemic proportions when a large number of animals are confined together. There appears to be a seasonal instance in New York State, this disease being more prevalent during the winter.

W. D. Pounden and J. W. Hibbs (1947), working at the Experimental Station at Ohio investigating scours, their cause and prevention, carried out extensive experimental work on rumen function in young calves and claim that the early establishment of rumen function can develop a satisfactory flora in the stomach with the synthesis of the necessary vitamins. The quantity of milk that Pounden gives is 0·9 lb. per 10 lb. weight daily and, if grain is fed, it should not exceed 0·5 lb. daily. He inoculated cud from adults to help develop the normal rumen flora on the fifth, tenth, 15th and 21st days. With regard to colostrum, he uses the first 24 lb. taken from the cow for a Holstein, and 18 lb. for a Jersey. He feeds the remainder of the colostrum to the other calves in the herd. He changes over to whole milk on the third day and gives one pint of whole milk per 10 or 12 lb. bodyweight daily; that is about 7 lb. for a Jersey, and 10 lb. for a Holstein. He then advises as follows: Continue at this rate until the sixth week and then cut milk to half during the seventh week. After that, all the milk can be taken away from the Holsteins; Jerseys and Ayrshires should be continued on milk two weeks longer and the milk removed only when the calf is learning to eat a liberal amount of hay. Overfeeding with milk can initiate scour.

Hay Pastures and Grain.—Offer good quality leguminous hay as soon as the calf will take it. Alfalfa and timothy mixed are quite useful. When the calf starts eating $\frac{3}{4}$ lb. to 1 lb. daily, give $\frac{1}{4}$ lb. of grain. The ideal mix is 14 per cent. to 16 per cent. protein with maize, soyabean oil and bran. In other words, the principle is to regulate the amount of meal to the amount of hay that has been taken and never give more than quarter to half concentrate daily. Alternatively, grind the hay and mix 4:1 and feed freely.

The type of scour described by Pounden appears to me to differ from the white scour syndrome which I have mentioned. The bowel movements in his case tend to be darker and I gathered that the disease was not quite so serious. I think it is comparable to some of the less severe scours we have in this country, developing probably in slightly older calves.

The white scour type of disease appears to be identical in U.S.A. and in this country. It seems to occur with very diverse types of calf management. One interesting feature is that the animal originally affected in an outbreak may not have had any outside contact or been even indirectly in touch with extraneous infection. When such an animal in a group of calves previously healthy does become affected, frequently the remainder, including those that have passed the very susceptible period of the first 14 days, succumb to the disease. There appears to be no doubt in those cases where infection does not seem to have been introduced that many factors may lead to a breakdown, *e.g.*, diet, climate or bad hygiene.

It is now generally accepted that absence of colostrum predisposes to the disease. *A. D. McEwen's* paper (1950) this year attempted to pin-point the factor in colostrum responsible for this protection. *Smith and Little* (1930) have proved that the factor present in the colostrum was also present in maternal serum but in less concentrated quality. *Lovell* advises giving two or three pints of serum taken from the mother or another cow. The calf's intestine is permeable to this serum for two days after birth. He considers that the lack of grass in the spring for the mothers during the later stages of pregnancy probably is more important than any other factor with regard to deficiency of vitamin A. Lovell deems it an advantage to feed calves three or four times daily with small quantities rather than twice a day and advises that changes in diet should be made gradually.

At one time the main factor in the colostrum was considered to be vitamin A and while no doubt it is important, it appears to play a subsidiary role. McEwen's work is exceedingly interesting in so far as it proves fairly conclusively that young calves, before and after receiving colostrum, and also after they have passed out of the most susceptible period (that is, the first fortnight in life), have no variation in the bactericidal action of their blood for the *B. coli* organism. There also appears to be a good

deal of evidence that this organism is inhibited by colostrum or serum from the maternal animal, in so far as *post-mortem* examination of many cases that died did not reveal a generalised *B. coli* bacteraemia when small doses of serum had been given. Calves that have reached a fortnight of age appear to be much less susceptible to the white scour type of disease although they can develop this at a later stage. In the West of Scotland I know of farms on which white scour is a serious problem, where colostrum is fed without fail, where vitamin concentrates have been used, and where conditions from the point of view of hygiene appear to be perfect. With regard to this last-mentioned point, calf hygiene, in my opinion, could be improved by the adoption of the type of system recommended at Beltsville in the U.S.A. It seems to me that the only logical conclusion to draw from recent work, particularly McEwen's, is that the factor responsible for the scour syndrome, whatever it may be, is not pure *B. coli*. Animals will die showing the typical scour syndrome when no *B. coli* bacteria are found and when the carcase, on *post-mortem* examination, appears to be completely sterile. It would be sheer speculation to attempt to define the nature of the actual cause but so far, to my mind, the possibility of a virus has not been completely ruled out.

The disease in calves described by *J. A. Baker* associated with virus is mostly manifested by pneumonic symptoms. I do not think that at this stage we can speculate profitably further on the cause, but if one concentrates on the methods that one might employ to minimise the losses, it is my view that much good can be done. One of McEwen's experiments was an investigation on the effect of unsatisfactory bedding, but his results, over a strictly limited number of cases, did not appear to indicate that this was an important predisposing factor.

While it is impossible to be positively definite about white scour, the following points are interesting:—

The disease can be developed without the introduction of a fresh case but when such a case is established it is markedly infectious for susceptible animals.

B. coli is present in many cases, but the following evidence suggests that it is not the primary cause:—

(*i*) McEwen's work shows that calves at birth, and after colostrum at two days old and a fortnight later, do not have any variation in the bactericidal properties of their serum for this organism. Yet it is well known that their capacity for resistance to *B. coli* differs greatly at these different stages. This would appear to suggest that the factor responsible for resistance is not a purely immune anticoli body, but may also relate to another organism. It is present in the maternal serum but not in such great concentration as in colostrum.

(*ii*) The factor in many cases protects in some degree against scours and may also be present in exceptional cases in milk from a cow six or eight weeks calved.

(*iii*) Many cases that have died of acute disease have no coli-septicaemia. Examination of some of these is negative for any organisms.

Dr. McEwen considers that the beneficial results following the feeding of colostrum are not due to the transfer of immune bodies with bactericidal qualities for *B. coli*. and that a calf deprived of colostrum that has survived for 14 days develops a species immunity to this organism.

Lovell and his co-workers (1949) ascertained that this protective substance is present in the whey factor.

The factor in colostrum that is responsible for some degree of protection cannot be detected as an immune anticoli body. Such protection cannot be attributed entirely to vitamin A and yet all the evidence points to some factor, probably an immune body, perhaps an anti-viral body.

I would like to make a plea to practitioners for material to investigate this disease. One of our graduates, Mr. Jarrett, is doing research on diseases of calves and we would welcome the opportunity of investigating material from typical outbreaks. If any member of the profession in cattle practice has a major problem of this nature we would be willing to give such help as is possible in our Pathology Department.

I do not know any sure means of prevention but I would like to draw practitioners' attention to the methods used by *Dr. Underwood* and his colleagues at Beltsville. Their system minimises the risk of spread of infection and their diet minimises digestive disturbances, particularly overfeeding, which is more dangerous than underfeeding. They attempt to put the calf on a diet that would encourage the use of the rumen and the development of suitable flora and the vitamins. They have introduced a system of bedding which, compatible with ordinary hygiene, ensures the maximum possible heat and avoids damp. With regard to this latter point, I know calf houses in this country that were built with high ceilings, open tubular divisions and with concrete floors that are always wet, even when the bedding is changed frequently. These houses are often damp, draughty and cold. It is noteworthy that the improved type of calf house I have described is often the aim of the farmer who pays much attention to the raising of young stock. He aims at fresh air and easily cleaned and disinfected houses and often achieves a most unsuitable house.

Diet.—It is important to ensure that colostrum is given, to remember that there is more danger in overfeeding than underfeeding and that steps should be taken to promote the rumen function by encouraging the ingestion of suitable food.

Routine recommended for M.R.C.V.S. when called in.—From the point of view of the veterinary surgeon, it is important that in a new outbreak some routine should be followed. I cannot think of anything better than that one of the sick animals should be brought in to a place of this kind for investigation. This could be done by biopsy, blood samples, etc., and if necessary a preliminary trial with chemotherapy ; this might indicate, pending the bacteriological examination, what type of therapeutic could be expected to help with the remainder of the calves. Therapy is not a substitute for the animal husbandry approach but once a fire has started one does not talk of fire precautions. The prophylactic angle with attention to husbandry should be the main approach. If the disease is not a typical white scours then I think it is more likely to respond to drugs (the sulpha drugs or the antibiotics). It might be that even an empirical administration of these in such a pilot case would yield information which could be applied to the remainder, or the isolation of organisms from the animal during life would indicate which line of treatment should be followed.

As I have said before, some U.S.A. practitioners claim results with streptomycin in some of these calf scours, but I understand that streptomycin used in the white scour type of disease in the East Coast in this country over a reasonable number of animals has failed to produce any significant result. Chloromycetin might be worthy of trial.

Work here at the College has indicated that some cases of pneumonia in calves associated with a very acute illness have been due to types of pneumococcus identical with the human types of that organism. Here antibiotic treatment might be of some service. Streptomycin could be given by mouth in calves born in infected premises although most of these cases are very acute and leave little time for treatment.

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ADDENDUM

When I had completed my paper I must say I felt a little disappointed that out of the large amount of material I had scrutinised and taking into consideration the distance that I travelled in the U.S.A. to see research institutions, etc.—probably between 6,000 and 7,000 miles—there is so little of a positive nature that I could put on paper with regard to these neonatal diseases. While this was my immediate reaction I did feel, however, that I had comprehended the magnitude of the task before us and the paramount importance of the problem being tackled in a very thorough manner. While the problem was not any nearer to being solved, it was appreciated that if attention was given to environmental factors, losses could be greatly reduced.

The situation at the moment in calf diseases appears to approximate the position with regard to vitamins prior to the 1914-18 war. At that time no one was aware of the nature, or in many cases even the existence, of these accessory food factors, yet many animals lived healthy lives, particularly if well-tried rational methods of feeding and husbandry were followed. I feel quite sure that the application of a similar type of knowledge, based on a fundamental knowledge of the animal's requirements, that conforms to the accepted principles of good husbandry universally applied, could mitigate greatly the losses we are suffering at the moment, pending the discovery of the actual cause. For instance, if I have gained nothing more from my visit to the U.S.A., I have acquired the knowledge that the methods of husbandry followed at Beltsville, and which have been applied in many other places in the U.S.A., very definitely reduce the neonatal mortality. It was a matter of surprise to me, however—though perhaps it should not have been—to find that many states not far from Washington, even the state institutions, were using methods of husbandry which were followed by considerable losses.

I would make a very strong plea for a concerted attack on this problem and feel that the contribution that can be made by the practitioner is very considerable. He is the person who first meets the stock-owner and, in this country, he is accepted as the confidant and adviser of the farmer on all matters concerning livestock.

Discussion

Mr. A. S. Chapman (Kippen, Stirlingshire) opened the discussion in the following terms: If I were to tell you of the difficulties I have experienced in rearing calves and the all-too-often unsuccessful results in treating them in illness I am sure you would wonder why it was ever suggested that I be one of the openers of this discussion on the diseases of calves; and when I add that on one farm alone, of 80 calves purchased in December, January and February last to be reared into bullocks only 60 now remain, I am sure you will be convinced that someone much more able than I could have been found. Perhaps you will be kind enough to look upon this as an example of the terrific loss not only to the individual but to the nation as a whole from calf mortality. I think that the death-rate in young bovines during their first year must amount to anything from 10 per cent to 20 per cent. What, then, is the cause of this alarming death-rate? I will attempt to give you my impressions as to this.

I think most of you will agree that this mortality has increased during the last decade. To my mind the factors are various. Let us start with the in-calf cow. Due to the present economy in agriculture much stress has been placed on milk. It has been in short supply and it is the one thing on which most farmers rely for a steady income. Cows are fed to produce the maximum amount of milk and as much as possible is sold off the farm. Little attention has been paid to the vitamin intake of the pregnant cow with the result that the colostrum is deficient in vitamin A. Young animals are born without any vitamin reserve and they must derive their supply from the colostrum. It is a well-known fact that calf diseases are most prevalent from New Year until the cows go to grass and this coincides with the time that the vitamin A content of the colostrum is at its lowest. One generally finds at this time of year that succulent green foods are becoming scarce and the farmer relies more on purchased feeding-stuffs from now onwards. Calves are born weakly, refuse to suck and are dead within three days. *Post-mortem* examination reveals an intense haemorrhagic enteritis, death being due to an acute septicaemia. I have found that when the cows can be fed on a vitamin-rich diet the death-rate can be lessened. It has been proved that calves born from cows whose colostrum vitamin A content is less than 250 units per c.c. readily succumb to white scour, joint-ill or pneumonia. To my mind, the one way to increase the vitamin A intake of the cows is by feeding kale until New Year and good silage after that. I feel sure that now the farmers are becoming more silage minded we might possibly look forward to healthier calves.

The other causes of calf mortality are usually found in bad housing and improper feeding. How often do we find calves in groups of anything up to a dozen in damp, badly lit, badly ventilated, foul smelling boxes. The result is a group of pot-bellied, ill-thriving animals which never grow to anything like the size they should, even when they come to calving down themselves. Calves reared under such conditions become an easy prey to all the diseases from which they may suffer.

It is important that the calf receive its dam colostrum; the benefits from this may be three-fold:

Firstly, it receives some immunity from the colostrum which it cannot receive from the colostrum of another cow.

Secondly, the colostrum assists the evacuation of the bowels.

Thirdly, it receives a supply of Vitamin A which is vital in increasing the calf's resistance to white scour, joint-ill and other bacterial infections.

The most usual practice in dairying districts is to pail-feed calves. To my mind there is no substitute for whole milk and I think it pays good dividends to keep calves on whole milk until they are three months old. There are many milk substitutes on the market but none can ever replace whole milk. It is becoming much more common, even amongst dairy farmers, to rear calves on a cow. Some cows are capable of rearing anything up to a dozen calves in a lactation, four being suckled for, say, three months, then another four and finally two until the cow dries off. Calves so reared are always in much better condition than calves which have been pail-fed and have received much more milk. I believe that the physiological action of sucking increases the digestive juices and promotes better circulation of the blood in the mouth and gums. The calves do much better by getting the milk

at the proper temperature and more slowly than do calves which gulp the milk from a pail which may not be beyond reproach.

On the question of housing, I find that calf diseases are less on those farms which have a properly constructed calf house, preferably with individual pens, and which are well ventilated, well lit and can be thoroughly cleansed. I have even found young calves to do well in an open hay-shed, divided off so that three or four calves can be accommodated in a pen, when there has been little shelter except the roof above them. On a recent visit to a farm on the east coast I found the calves housed in the hay-shed with a division about 4 feet high between each pen and a gate covered with sacks in front of them. I was informed by the owner that he had no trouble with his calves since they were moved into this, even when snow had blown back half-way into their pen. Before that time he had had endless trouble with his calves when they were housed in more comfortable surroundings.

Regarding the diseases from which calves may suffer, I think white scour, joint-ill and pneumonia could be grouped together. Differentiation is often difficult on aetiological grounds. Clinically they can be differentiated by the manifestation of particular symptoms. White scour is probably the most common and usually occurs within a few days of birth. There is marked prostration and light-coloured, watery diarrhoea. *B. coli* is generally designated as the causal organism. This organism is normally present in the intestine of animals, gains the upper hand due to lowered resistance, becomes more virulent and an acute septicaemia results. This virulent infection passes to other calves, the calf boxes become infected and the disease continues until some control measures are carried out. The disease often occurs spontaneously in self-contained herds and in some years may reach epidemic proportions. In those years the disease may occur just as badly in suckled calves as in those which are pail-fed. The calves are born weakly and dull, will not suckle or drink and are dead in three days without showing further symptoms. The disease is much more likely to occur in a herd into which an animal has been brought from an open market. Those calves usually have their resistance lowered, this being due to a long fast following a large quantity of milk given just before they left their original home, getting chilled in transit and lying about the market and then being given too much milk on arrival at the new premises.

Joint-ill is characterised by a sero-fibrinous arthritis with swelling of the joint and lameness. There may or may not be a purulent inflammation of the navel. Navel trouble may be prevented by keeping the calves in separate pens in order to avoid the sucking of navels. Navel dressings are of doubtful efficiency. I tend to the view that navel-ill is another manifestation of the same septicaemic condition as white scour.

Pneumonia in the young calf often can occur in association with the two foregoing conditions. I have heard the view expressed that a streptococcal pneumonia may follow the ingestion of milk from a cow suffering from streptococcal mastitis. I cannot find any evidence that such is the case or that milk from infected cows can cause disease in calves; nor can I subscribe to the view that mastitis milk will cause any immunity in the calf ingesting it. There is the possible exception that the ingestion of material containing *Coryne pyogenes* may cause a *Coryne pyogenes* pneumonia. I have known cases where calves actually did suckle a quarter infected with *Coryne pyogenes* and no untoward results followed.

I will not linger long over the treatment of the above conditions. All of you will have tried the various drugs known to be effective and will stick to the one you like personally. For my part, I think there is little to choose between phthalyl-sulpathiazole and sulphamezathine in the treatment of white scour. Sulphapyridine I find most effective in joint-ill and in pneumonia I use penicillin in conjunction with sulphapyridine. As a prophylactic in white scour I still use *B. coli* antiserum. This must be given within 12 hours of birth if it is to be effective. I find on some farms that this alone controls the disease; on others it makes precious little difference. I can only conclude that in the latter cases I am working with a more virulent infection or the serum is not protecting against the strain of organism on that particular farm. On one farm all calves are given an injection of 500,000 units vitamin A at birth. This is sometimes repeated in two or three days. This usually keeps the disease in check but sometimes, especially in the spring, *B. coli* antiserum has also to be given.

In older calves a disease known in our district as mumps often occurs. Swellings appear on the cheeks and the animal salivates. Examination of the mouth reveals necrotic areas and the tongue may be affected. The condition is caused by the organism *Fusiformis necrophorus*. If the condition is allowed to progress diphtheria ensues, characterised by the formation of a diphtheritic membrane on the mucous lining of the mouth and pharynx. This may involve the nasal passages, trachea and lungs when death is the ultimate end. I find that swabbing the necrotic lesions of the mouth with tincture of iodine and the administration of sulphamezathine usually effects a cure.

Scour in older calves is generally attributed to a salmonella infection, *S. dublin* being the common organism. The diarrhoea is at first sticky, becoming thinner and brownish with terminal streaks of blood. As the disease progresses the diarrhoea becomes watery and lighter in colour. Finally, mucus and small clots of blood are passed. The animal runs a temperature up to 103° or 104°. Pneumonic symptoms are not uncommon. The disease seems to be most prevalent on those farms where the hygienic conditions are not good, faecal contamination of the feeding utensils being an important factor.

I could not pass from the diseases of young calves without at least mentioning briefly one or two conditions which can give rise to some worry. I might group them together under one heading, "convulsions in calves." From my experience I sometimes find it difficult to differentiate hypomagnesaemia, digestive upsets and lead poisoning. In the first condition the calves are usually being well fed on the pail, are in good order and a month or two old. Commonly the animal is found dead and *post-mortem* examination reveals nothing unusual. If one is fortunate enough to find the animal alive, magnesium sulphate subcutaneously is indicated. If one suspects a hair ball or twine lodged in the fourth stomach nothing short of a gastrotomy will effect a cure. In all cases of fits in calves of an obscure nature it would be wise to examine for lead poisoning.

In recent years parasitism in young animals has become most prevalent. Here again the condition is best controlled by good husbandry. I always advise the keeping of calves born after New Year indoors during their first year. Calves born before New Year may be allowed out to graze during the summer months. It is advisable, however, that those calves be housed during the night and fed adequately on a ration containing linseed cake. To my mind, the best way of curing animals of hoose is by feeding them. Intratracheal injections can be used and intramuscular injections of Anthiomaline can be tried, but both have their limitations and never replace feeding. The pastures used for calves should be in their first year, should not have been grazed by older animals the previous year, and should not have been top dressed with farmyard manure. As a preventive of parasitic gastritis young animals should be dosed monthly with phenothiazine. This has little effect on the hoose worm but it does lessen the parasitic burden and thereby helps to tide over the critical time when hoose could be expected

I have said little regarding the actual diseases of calves but I hope I have said enough to induce a good discussion. I will be content to listen and learn from those who know more than I do.

Mr. Begg assured Mr. Weipers that coccidiosis was quite a common disease in housed cattle. Like the essayist, he could not imagine where the original infection would start but in isolated cases he had found that coccidiosis could cause quite serious trouble. Mr. Begg made a plea for the teat bucket and considered that the cost of £4 for each one was quite justified by the good results which followed their use.

Mr. Dykes expressed interest in the point of view that certain viruses used for the control of rodents might be involved in initiating diseases in calves. He recorded that many years previously an Army Order had drawn attention to this possible source of disease in humans. While conceding the importance of vitamins A and D, he considered that vitamin C was particularly important. Vitamin C probably was produced in the cortex of the adrenal and the point made by Mr. Weipers with regard to failure in certain genetical patterns to transmit the capacity to produce or utilise vitamins might operate through this mechanism. With regard to lead, he considered that if the animal had had the poison for 48 hours a very simple test was to draw a little blood, when microscopical examination would reveal stippling of the red blood corpuscles. This stippling was characteristic only of lead.

Mr. McALLISTER agreed that Udall's solution, *i.e.*, that the animal should be suckled, was indeed a good one. With regard to the presence of the protective factor in the colostrum, would anyone give an opinion on the effect of pre-milking which was carried out in Friesians? Was this likely to deprive the calves of the benefits in colostrum? He usually advised the farmer, in the case of a sickly calf that would not suck, to bottle down colostrum. He tried maternal blood with rather mixed results. He had found beneficial results following the administration of 10 c.c. of *B. coli* serum in certain cases but in one farm where the farmer had lost eleven calves in ten days, in spite of this dosing, he administered 50 c.c. whenever each calf was born and since then the mortality had been reduced almost to nil. He found aureomycin quite successful when he had an opportunity of giving it a preliminary trial, but the cost would have been prohibitive.

He considered that Lovell's survey was inaccurate—in any case, with regard to the West of Scotland—and that there was a loss of from 25 to 35 per cent. in calves in the Wigtownshire district. He agreed that big herds and high latitudes were two of the worst contributing factors. The type of organism present varied, but he frequently found haemolytic coli, salmonella and pasteurella. In many places he had found that vitamin A was very helpful.

Mr. JARRETT, from Cupar, said that in his part of the country the beef breeds were suckled and many of these developed scours. With regard to Mr. McAllister's point about pre-milking, he did not consider that this gave rise to any serious effect, either in the cow or in the calves.

Mr. BOYCE asked Mr. Chapman about the frequency of pasteurellosis in calves and was told he had only once had a bad outbreak in young stock. It was much more frequently met with in adults, where it appeared to cause transit fever.

Mr. JARRETT, JNR., enquired, if Mr. Chapman attached such significance to vitamin A, how would he explain that in Lovell's survey the disease was most prevalent in South Wales immediately after the animals came in from grass?

Mr. CHAPMAN replied that in Scotland 50 per cent. of the cows calved in the back end of the year, but he did not get his worst scours until the turn of the year.

Mr. WEIPERS suggested that the animals reported by Lovell in South Wales merely indicated one factor, that in certain cases was important, in other cases not, and supported the suggestion that most of the factors under discussion that day were only ancillary to some primary factor causing the disease.

Mr. MOODIE said that in Ayrshire the number of calves born in the spring was much greater than at any other time. He discussed a condition in beef calves associated with fits, showing the same sudden onset that Mr. Chapman described in hypomagnesaemia. He wondered why hypomagnesaemia should occur in calves. He could understand lead poisoning occurring in calves even when there was no obvious source of lead. He considered that the condition described in beef cattle was probably associated with a Welchii type of infection. In his view, the importance attributed to hair ball by farmers was analogous to what used to happen in the case of sheep with wool ball. In the latter, the condition was much more often a lamb dysentery associated with Welchii and he believed that the same obtained in the former case. He had had very good results in these beef herds where this condition was common by inoculating the calves with Welchii vaccine, type A.

Mr. WILSON (Cupar) supported the plea for sending calves for investigation. He had had much help from Mr. Stamp. He underwrote everything that had been said about the variable nature of the outbreaks and the unpredictable course of epidemics. He considered that in his part of the country disease was due in the main to the *B. coli* organism and he had been relatively successful with coli serum, giving 20 c.c. as a prophylactic. This frequently reduced the mortality and seemed to help control the disease for a year or two, but by that time other organisms appeared to take the place of coli: streptococcus, staphylococcus and *B. enteritis*. Many farmers, after one year's success with inoculating coli, stopped using it and the disease appeared with redoubled force. When coli serum failed to hold up the disease his next line of advance was blood transfusions. He gave 300 c.c. of maternal blood, citrated, using pyrex bowls, which were easily sterilised, and giving the blood subcutaneously. This was often followed by large swellings but never by an abscess. His standard treatment in new cases was sulphamethazine, bismuth, salicylate, brilliant green, opium and kaolin. With regard to the occurrence of scour in suckled calves, he quite agreed, but he also agreed with Mr. Moodie that Welchii "A" type vaccine was very useful in these cases. He also had another type of brown scour, usually from calves that had been brought in. In many cases the white scour previously mentioned occurred in young animals that had been brought in. In the brown scour type he gave no food whatever for 24 hours and no bedding.

(*Concluded at foot of next column*)

VETERINARY OBSTETRICS IN SWEDEN

BY

HUGH BOYD, M.R.C.V.S.

In Sweden at the beginning of this century the importance of sterility work and obstetrics in ordinary veterinary practice was so great that it was necessary for the Veterinary College in Stockholm to separate the teaching of Obstetrics from Surgery, and establish an independent Department of Obstetrics and Gynaecology. This department has extended considerably, and recently has moved into extensive and modern buildings.

The teaching staff have enough free time and laboratory facilities to carry out a considerable amount of research. This can be seen from the recent publications from the department of work on nymphomania (Garm), identical twin bull experiments (Bane), urinary excretion of neutral steroids in bulls (Meschaks), investigations on infertility in boars (Holst), and infertility in bulls (Lagerlöf). At the same time the staff does not become too academically minded, as the needs of general practice are constantly emphasised by the presence of the ambulatory clinic, and by the considerable amount of diagnostic and advisory work done for breed societies, artificial insemination centres and animal insurance companies.

With this blended background of practice and theory, the student receives a very thorough training in obstetrics and sterility work. The methods used for training in the practical techniques are unusual, inexpensive and most effective. In the "phantom hall" there are dummy or phantom cows on which the student learns the correction of abnormally presented calves, the use of the embryotome and the removal of retained afterbirths. There are five phantoms for parturition, each of which is a wooden box or cylinder containing a cow's or mare's pelvic bones. Attached to each pelvis is a leather "uterus" in which is placed an unborn calf from the slaughterhouse. When practising embryotomy, the student uses Thygesen's original model to deal with all abnormal presentations calling for embryotomy. The original model is used because 30 years' experience by Swedish veterinary practitioners has shown it to be superior to all adaptations which have since been produced. After this training and with experience in practice the Swedish veterinary surgeon becomes so adept at the use of the embryotome that caesarean section is very rarely indicated or employed in Sweden.

There are three other phantoms on which the student practises the removal of retained afterbirths. Uteri from cows soon to calve are obtained from the slaughterhouse; the calf is removed through an incision in the uterus which is then sutured. The cervix is removed and the uterus with placenta attached is then placed in the phantom. The student who will take the afterbirth wears on his right hand an arm-length rubber glove and on his left an ordinary rubber glove. Swedish veterinary surgeons and inseminators use arm-length rubber gloves for all rectal and gynaecological work, and find that it gives much protection from infection. When he has removed several

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If bedding were given almost invariably the animal developed fits and died. He then brought the animal very gradually on to small quantities of milk and in many cases animals that would have died, survived. In many cases of lead poisoning the origin of the lead was very obscure; usually they were not consulted until two calves had died. Mr. Wilson concluded by mentioning some interesting cases in which the lead was discovered only after very close scrutiny.

afterbirths in the phantom hall the student is given the opportunity of removing retained placenta in cases encountered in the ambulatory clinic, and thus gains experience in this technique while he is still at college.

The first stages of learning to palpate the genital organs per rectum are also begun in the phantom hall. After an introductory lecture the student palpates, on a specially designed table, complete genital organs from the slaughterhouse. When he is familiar with the technique he trains on cows waiting to be slaughtered at the abattoir. Having thus obtained some experience he continues to practise in the ambulatory clinic until he has made 100 to 150 pregnancy diagnoses and examinations for sterility.

The ambulatory clinic is worthy of special mention. About 10,000 cows, 1,500 horses and 4,000 pigs are attended annually by students who have completed their work on the other college clinics.

One wonders whether the facilities in this subject at the British Veterinary Schools could not be improved and enable the veterinary graduate to deal to the best advantage with the large problem of infertility.

"A HARMLESS NECESSARY CAT?"

It is axiomatic that the now well-established principle that there should exis: the closest liaison between the veterinary and medical professions in the control and treatment of diseases of animals transmissible to man should extend to those of the smaller species. We welcome, therefore, the reminder embodied in the following editorial note, published under the above heading, in the July issue of *The Practitioner*:—

"According to two Boston workers in an article referred to in 'Practical Notes' (p. 92) this month, 'it seems that present dangers of disease transmission by house cats are not well recognised.' Certainly the list provided of diseases transmitted by cats is formidable. It includes tularaemia, rabies, rat-bite fever, virus pneumonia, diphtheria, tuberculosis, brucellosis, plague, ringworm and favus. Without becoming alarmist, there are two aspects of this problem which require attention. In the first place, owners of cats should be warned of the possibility of infections from diseased cats, particularly when there are young children in the house. A cat may sneeze as well as look at a king, but a sneezing cat should be kept away from children. The second wise precaution to be taken is on the part of practitioners. They should take the advice of Professor Boddy in the article on 'diseases of domesticated animals constituting a hazard to mankind' which we published last year (*The Practitioner*, July, 1950, **165,** 67) and keep in touch with veterinary surgeons in their areas. Such co-operation 'will often prove of assistance in coping with problems arising from the infection of human beings with diseases of animal origin.' Lovable though many cats may be, diseased or stray cats should be dealt with in the words of the inscription carried on their banner by the Clan Chattan in 'The Fair Maid of Perth': 'Touch not the cat, but a glove'."

The "Practical Note" to which *The Practitioner* makes reference is as follows:—

Cat-scratch Fever

"In describing the first case of cat-scratch fever to be reported in the English literature, W. E. R. Greer and Chester S. Keefer (*New England Journal of Medicine*, April 12th, 1951, **244,** 545) give a summary of the salient findings. The disease is suggestive of, but much milder than, tularaemia. There is always a history of contact with a cat. In the case reported there was a history of a scratch from a cat and of the patient, a man aged 36, waking up one morning to 'find his cat licking the left side of his neck in an area that contained two pimples.' Four days later a painless swelling was noticed in this area of the neck. There are malaise and fever as a manifestation of a generalised infection, but 'the brunt of the infection is borne by lymph nodes.' Occasionally there may be skin eruptions resembling erythema multiforme or erythema nodosum. There are no distinctive clinical or laboratory findings, but a specific skin reaction can be obtained from the intradermal injection of material prepared from the infected lymph glands. The causative organism is unknown but is probably a virus. The disease is a self-limited one and there is no specific treatment. In the case reported in detail, the temperature rose to 102° F. on the first three days in hospital and returned to normal on the fifth day."

CLINICAL COMMUNICATION

STREPTOMYCIN AS A BACTERICIDAL AGENT AGAINST *CORYNEBACTERIUM PYOGENES* AND *STAPHYLOCOCCUS AUREUS* INFECTIONS IN DAIRY CATTLE

A. STEELE-BODGER,
Lichfield, Staffs

Since streptomycin became available to the veterinary profession it has, in my hands, proved a most effective agent in some infections which do not respond either to penicillin or to the sulphonamides. In this communication three cases are quoted—one each of typical summer mastitis and acute staphylococcal mastitis and one "hike" injury which became infected with *C. pyogenes*.

Last summer in all cases of *C. pyogenes* mastitis in which streptomycin was used the systemic reaction subsided within 24 hours or less; in four cases the quarter recovered to give normal milk. In cases of acute staphylococcal mastitis it has been my experience that 1 gramme streptomycin parenterally is infinitely more effective than 4 × ·25 gramme steptomycin infused into the udder in the form of an oil-wax suspension.

Microscopical confirmation of the clinical diagnosis was carried out in each case.

Case 1.

Subject.—Attested British Friesian cow not in milk.
History.—18.7.50.
5 p.m.—Udder normal.
9 p.m.—Secretion foul-smelling, blood-streaked, thick dirty yellow; general appearance distressed; temp. 103·4° F.; inappetence; respiration and pulse accelerated.
Diagnosis.—*C. pyogenes* mastitis.
Treatment.—Quarter stripped out; 3 grammes streptomycin intramuscularly; 1 tube Protegan via teat canal.
19.7.50. 7 a.m.—Temp. 102·2° F., general appearance better; pulse and respiration normal; quarter not so painful or swollen; secretion thinner, brighter yellow, no blood, odour much less marked. Quarter stripped out. 3 grammes streptomycin intramuscularly; 1 tube Protegan.
2 p.m.—Quarter stripped out; secretion thin yellow with clots, no smell; general appearance normal; 1 tube Protegan.
9 p.m.—Temp. 101·4° F.; quarter painless, cool and much softer; secretion thin and golden, very few clots; 3 grammes streptomycin intramuscularly; 1 tube Protegan.
20.7.50. 7 a.m.—Quarter normal; secretion thin, clear and golden; 1 tube Protegan—this was repeated in 24 hours and the udder then not handled.
Four weeks before calving the quarter began to enlarge slowly to about twice the others—the secretion was clear and golden and the animal unaffected. Masterly inactivity was advised. The quarter both clinically and biologically was normal after parturition.

Case 2.

Subject.—Pedigree attested Guernsey cow.
19.8.50.—At the evening milking the right hind quarter was hot, hard and painful; secretion thick yellow with dirty clots; the stockman infused the quarter with 2 × 100,000 units penicillin.
20.8.50. 9 a.m.—Temp. 106·2° F.; quarter larger, more painful; secretion watery-yellow with thick clots; general appearance poor, no appetite, no rumination, faeces thin and foetid.
Diagnosis.—Acute staphylococcal mastitis.
Treatment.—Quarter stripped out; 3 grammes streptomycin intramuscularly; 1 tube Protegan.
1.30 p.m.—General appearance better; secretion thicker and paler yellow; 1 tube Protegan.
9 p.m.—Temp. 101·8° F.; general appearance much better; quarter much reduced; secretion yellowy white with some clots; 3 grammes streptomycin intramuscularly; 1 tube Protegan.
21.8.51. 9 a.m.—Appetite, temperature and general appearance normal; quarter almost normal; secretion like milk with a few flecks but no more clots; 3 grammes streptomycin intramuscularly; 1 tube Protegan.
4.30 p.m.—Evening milk went into the churn.

On this particular farm there had been similar cases before and in each case within 48 hours the animal has been either decumbent, dying or dead.

Since this case it has been found that doses of 1 or 2 grammes streptomycin alone have been sufficient to effect clinical cures.

Case 3

Subject.—Pedigree attested Ayrshire heifer.

Came in for afternoon milking with a puncture wound on the middle third of the neck level with the cervical vertebrae. Circumference of puncture about 1 cm., depth apparently only to superficial muscle.

Next morning the animal showed a marked drop in milk and was running a temperature of 103° F. 100 c.c. of sulphamezathine was given intravenously and hot fomentations applied.

The following day the animal gave no milk and was off its food. A plaque-like swelling had appeared round the wound and the temperature was 104·5° F. 1 gramme streptomycin was given intramuscularly. Next day the temperature was normal—appetite was restored, the milk yield rising and the plaque subsiding. Local antiseptic treatment using streptomycin tubes was advised.

Four days later the temperature was 103° F.—no appetite, milk yield falling and a large plaque appearing on both sides of the neck. 3 grammes streptomycin were given intramuscularly. The temperature was the same and the swelling larger after 12 hours, so 5 grammes streptomycin were given intramuscularly.

After a further 12 hours the temperature was 102·8° F. and the swelling beginning to subside: the purulent discharge became more profuse and foul-smelling—laboratory examination produced a pure culture of *C. pyogenes.*

Five grammes streptomycin were given at 12-hour intervals for the next four days by which time all swelling had subsided and the patient made a steady and uneventful recovery.

BACTERIOLOGICAL NOTE

The Isolation in Pure Culture of a Coliform Bacillus belonging to the Paracolon Group from the Carcase of a Ewe submitted for Meat Inspection.

R. O. MUIR, B.Sc., M.R.C.V.S., J. NORVAL, M.R.C.V.S., AND E. J. L. SOULSBY, M.R.C.V.S., D.V.S.M.

The isolation from a sheep carcase of a bacillus, which was assigned by cultural and serological tests to the so-called paracolon group of enteric bacteria, is considered sufficiently important to warrant a record of its occurrence, not only from the bacteriological point of view, but also from the public health aspect, since paracolon bacilli have been incriminated as the cause of at least one outbreak of food-poisoning (1947).

History and Clinical Symptoms.—The subject, a half-bred ewe, was brought into the Casualty Block, Edinburgh City Abattoir, on March 15th, 1951. The animal had developed symptoms of pregnancy toxaemia the previous day and was dispatched to the abattoir for slaughter as a casualty without any attempt at treatment. On arrival at the abattoir the ewe was in a slightly comatose condition and was unable to stand.

Post-mortem Appearance.—The carcase bled reasonably well and set well, without evidence of fever. The liver was slightly enlarged and very fatty with a yellowish mottling of the lobules which gave it an exaggerated "morocco leather" appearance. The animal showed a twin pregnancy and both lambs had died presumably only a short time before slaughter as there were no signs of decomposition.

A decision on the fitness of the carcase for human food was delayed pending the result of a bacteriological examination.

Bacteriological Examination.—Cultures from the bile and kidneys were made on plates of MacConkey's bile salt medium. Enrichment cultures of samples of the meat taken from the hindquarters in the region of the popliteal lymph gland and of the liver, spleen and kidneys of one foetus were obtained in Leifson's biselenite broth by incubation for 24 hours, after which subcultures were made on MacConkey's bile salt medium.

After incubation for 24 hours, all plates showed a profuse growth of a non-lactose fermenting, slightly motile, coliform bacillus which was classified by its biochemical properties and negative agglutination tests with polyvalent, specific and non-specific "H" and group-specific "O" Salmonella antisera as a paracolon bacillus.

Subsequently, bacteriological examinations of organs and tissues from four more ewes sent from the same farm to the abattoir for casualty slaughter due to the same condition of pregnancy toxaemia, all proved negative.

Discussion

As far as can be ascertained there is no record of a bacteraemia in sheep due to paracolon bacilli. The fact that four more sheep, from the same farm and affected with the same disease, pregnancy toxaemia, showed no evidence of infection with paracolon bacilli would indicate that the infection was of a sporadic nature.

From the public health aspect it is interesting to note that food poisoning due to paracolon bacilli has been recorded previously (1947).

In the present instance, an outbreak of food poisoning might have occurred had this carcase been passed as fit for human consumption. It would therefore appear essential that, in the course of meat inspection, bacteriological examination should be practised in the routine examination of all species of casualty animals which show evidence of toxaemia, even if apparent only in one of the internal organs.

Summary

The isolation, in large numbers, of a paracolon bacillus from the abdominal viscera and flesh of a ewe and from the internal organs of its foetus, probably resulting from an *ante-mortem* invasion of the blood from the bile or intestine, due to physiological changes associated with pregnancy toxaemia, is described.

Without bacteriological examination the carcase might well have been passed as fit for human consumption.

The provision of bacteriological facilities at abattoirs for the examination of casualty animals is imperative.

Reference.—Report of the Ministry of Health for the year ended March 31st, 1947. H.M.S.O.

BRITISH SUCCESSES AT VENICE SCIENTIFIC FILM FESTIVAL

The first prize for scientific and documentary films shown at the Venice Film Festival has been awarded to Britain for "having presented a most remarkable number of films of a high technical, scientific, and cultural level in each of the groups and sections of the festival." The British films which won first prizes in their sections were *The Life Cycle of the Malarian Parasite* (Scientific-Medicine), *Magnetism* (Scientific-Physics), *Waters of Time* (Technical Films), *Caribbean* (folklore and landscape), *Henry Moore* (Sculpture), and *Science in the Orchestra* (Musical). In the section devoted to Scientific-Physics *How Television Works* received honourable mention.

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Weekly Wisdom

The inductive research worker does not believe in miracles and this disbelief does not diminish the reverential awe in which he holds all nature.—Konrad Lorenz: "Gesalt Perception in Behaviour."

ABSTRACTS

The Science of Meat *

This introductory paper to a conference of the Nutrition Society comprised "a brief outline of our knowledge concerning the selection and breeding of our meat animals, and the effect of such factors as growth and fattening, fatigue and fasting on the nature of the meat produced, especially in relation to its storage, cooking and eating." The proceedings of the conference as a whole deserve the close attention of all members of the veterinary profession concerned with meat production and inspection.

Breeding for Meat.—Domestication implies feeding the animals on a higher plane of nutrition than is possible in the wild state and, as Hammond has shown, higher planes of nutrition favour the later-developing parts of the body. The more valuable loin and hindquarters therefore account for a greater proportion of the carcase in domesticated breeds. Our meat breeds have in fact been selected by breeding from strains which respond best to high planes of nutrition: the well-known weight-for-age criterion. Although this policy has undoubtedly greatly improved our meat breeds, it has inevitably encouraged thickness of bone as compared with length, and the formation of subcutaneous fatty tissue as opposed to intermuscular fatty tissue. Pigs have much more subcutaneous than intermuscular fat, whereas sheep have about equal proportions and cattle have considerably less.

Growth and Fattening of Meat Animals.—Growth in meat animals has three main stages, and all three start at the head and feet and proceed along the body to the loin—the point at which growth persists longest. In the last stage, namely, fattening, fatty tissues are growing faster than muscular tissues, and muscular tissues faster than bone. Owing to the nature of growth, the tissues in the different parts of the body are at different physiological ages. As a consequence, the chemical composition of the tissues differs in the various parts of the body and exhibits growth gradients similar to those existing at the anatomical level. Despite the variations within any single carcase, however, it is possible to follow the changes in the carcase as a whole during fattening with considerable accuracy. The percentages of fatty tissue, muscular tissue and bone in carcases at various levels of fatness are closely interrelated, and mathematical expressions of these relationships are given.

Chemical Composition of Meat.—Equations are given (i) relating the percentages of fat, water and dry fat-free residue in boneless meat, (ii) expressing the percentage of protein, and (iii) expressing the percentage of extractives, natural salts and lactic acid in boneless meat. Altogether, including proteins and fats, over 50 substances have been listed as occurring in meat.

Compositional Changes During Fattening.—During fattening the fatty tissues become more and more engorged with fat, the percentage of which rises from about 70 to 85 and even 95 in the peri-renal depots. Muscular tissue may be considered as a system of muscle fibres held together with a soft skeleton of connective tissue (both collagen and elastic) and interpenetrated by intramuscular fatty tissue. During fattening the percentage of fat in muscular tissue rises from about 4 to 8·5.

Effect of Fatigue on Quality of Carcase.—Rapid changes are brought about by fasting and fatigue during the journey from farm to abattoir. In pigs fasting may cause a loss in carcase weight of up to 2 lb. per 24 hours of fasting. Muscular fatigue depletes the glycogen reserves of the muscles and since glycogen is changed *post-mortem* to lactic acid, the *p*H of the muscle varies with the degree of fatigue and the amount of available glycogen.

Conditioning of the Carcase.—The *post-mortem* change in the *p*H of muscular tissue may be slowed down by rapid cooling, and so may the accompanying change in microstructure from a "closed" to an "open" one. An open microstructure leads to more "weep" with fresh meat, more "drip" with frozen and thawed meat and greater shrinkage in cooking. Tenderness and toughness, however, depend even more upon the proportion of connective tissue, and this may be reduced by hanging, which enables the lactic acid and phosphates to change collagen to gelatin.

Age of Animal and Quality of Meat.—Young tissues are pale, flavourless and tender, while older tissues are darker coloured, more flavoured and tend to be tougher. The colour is due to myoglobin, and a calf remains anaemic if fed on milk, but ceases to be so if turned out to grass. Milk feeding and veal go together. Parallel with the darkening of the colour are the production of extractives and the development of flavour.

A. N. W.

* * * * *

Treatment of "Gid" in Sheep *

The author recounts his experience in the treatment of "gid" or *Coenurus cerebralis* infection in sheep during an extensive outbreak among the flocks owned by the Smartt Syndicate, Britstown. This outbreak was attributed to the large number of dogs on the property, and to the careless disposal of sheep offal which it is customary to sell to the labourers. Over 200 sheep died from the infection.

In regard to diagnosis, the author emphasises an important practical point, namely, that the site of the bladder worm cyst can be localised on the skull by a detectable thinning of the frontal or parietal bones, but that this thinning is confined to young sheep (12 to 18 months old). He was unable to detect this phenomenon in sheep of four-tooth or over.

After sterilisation with absolute alcohol, a sterile needle is inserted at the site and the clear cyst fluid allowed to drain through the needle by gravitation. When this is complete the needle is withdrawn and the area again sterilised.

Following this treatment 39 out of 63 treated sheep apparently recovered fully. Twelve sheep died and another 12 were still under observation. In the latter group symptoms of gid recurred and further cysts required drainage.

The author directs attention to the following points of interest: (1) Sheep with one cyst and from which clear fluid is drained invariably recover. (2) If drainage fluid is blood-stained the sheep does not recover. (3) No sheep older than four-tooth have recovered from the operation, but the incidence of infection was much greater in young sheep (20 : 1). *Post-mortem* examination of recovered sheep indicates that after collapse the cyst does not refill, and that there is an overlying encephalitis and meningitis which apparently does not affect the sheep's health.

W. L. S.

* **Brief Review of the Science of Meat.** Callow, E. H. (1950.) *Brit. J. Nutrit.* **3**. 375-380.

* **The Treatment of "Gid" in Sheep.** de Villiers, S. W. (1950.) *J.S. Afr. Vet. Med. Ass.* **21**. 155-157.

REPORT

[Society for the Protection of Animals in N. Africa : Report for the Year 1950.]

The current report gives cause for great satisfaction in that the Society has found it possible greatly to extend its activities on behalf of the ill-treated animals of North Africa.

The Bank of England agreed to allow the Society to transmit to North Africa two and a half times the amount of sterling previously permitted. This allowed an all-round increase in the volume of work; helped the provision of more hospitals; increased the wages (and thus the interest) of the Arab dressers; made possible the repair of stables, dog kennels and cat houses; and the purchase of the fondouk premises at Gabes which previously had been rented at £350 p.a.

At all towns in which the Society functions similar expenditures and improvements took place.

An outstanding event of the year was the passing of a decree in Tunisia limiting loads to 900 kg. for horses and mules and 500 kg. for donkeys. Where the decree could be put into practice and enforced, the amount of distress suffered by animals must have been greatly decreased. Yet even 500 kg. is very excessive for a donkey.

A great amount of " humane education " literature was disseminated in both French and Arabic, particularly to the schools

The building of a bull-ring at Tangier was much resented by the Society, which did all in its power to prevent it. But its efforts were hampered by the patronage given to the bull-fights by the British residents. The report states: " We cannot too strongly deplore and condemn this action of our fellow countrymen who, instead of setting a good example to the Moorish and Spanish elements of the population, are hindering the progress of civilisation by associating themselves with the worst form of brutality."

It is interesting to note that the number of treatments accorded to sick and injured animals of all kinds during 1950 totalled 152,795.

H. K.

REVIEWS

[Milk Testing. By J. G. Davis. Published by Dairy Industries Ltd., 24, Bride Lane, London, E.C.4. Price 15s.]

Here is another book by this well-known author to add to that already extensive line of reference books. It is a straightforward compilation of information relating to the various methods of testing milk. Physical, bacteriological and chemical tests are all dealt with in detail and are very easy to follow. So far as the veterinarian is concerned, the sections on examining for mastitis and the various procedures for estimating the quality of milk, such as the resazurin and methylene blue and freezing-point tests, will be of particular interest.

* * * * *

[Spotlight on Animals. By Chapman Pincher. Published by Hutchinson. Price 12s. 6d.]

There are many approaches which may be made to the subject of writing on animals, ranging from the merely maudlin to the strictly scientific, the many gradations lying between these two extremes forming a Tom Tidler's ground for people with dubious literary ability and a doubtful scientific background. Mr. Chapman Pincher has, however, approached his subject with a most refreshing objectivity, and has combined the fruits of his enquiring mind with a stimulating literary style.

He has taken as his field not only the animal kingdom, but also writes authoritatively on fish, insects and birds. " How does a bee fly?", " Does the elephant forget?", " How to take a whale's temperature ", " Sleep and hibernation ", " How does a pigeon find its way home?", " How stupid is a sheep?" are some of the questions which Mr Chapman Pincher answers in a book that is packed with meat from cover to cover.

This is not a book for cursory perusal. It is one for intelligent and enquiring people, professional or lay, young or old.

The book is profusely illustrated by woodcuts of Eric Tansley's which are sympathetic and percipient.

IXth World's Poultry Congress—Paris, 1951

As was intimated briefly in your last issue, for the ninth time a World's Poultry Congress has been held, under the auspices of the World's Poultry Science Association. Mr. M. W. D. Termohlen, who has just vacated the Presidency of the Association, sums up the objects of these congresses in the following terms:—" . . . the World's Poultry Congress has come to be considered as an outstanding example of how persons from all parts of the World who are contributing to the advancement of the various branches of the Poultry Industry meet together to exchange knowledge and experience regarding this great world-wide industry." The Congress was honoured by the presence at its opening meeting of the then Minister of Agriculture, M. Pierre Pflimlin, and was further greatly honoured by the reception given to a number of delegates from the different countries by M. Vincent Auriol, President of the French Republic.

In all, 39 countries were represented and a total of 139 papers was presented. The meetings were arranged in five sections, viz. (1) Genetics and Incubation; (2) Nutrition, Physiology and Rearing; (3) Investigation of Diseases and their Control; (4) Economic Problems and Marketing; (5) Education and Organisation.

Naturally, veterinarians were more interested in Section 3, but they also found important discussions on problems affecting poultry health in some of the other sections.

Section 3 had as its President, Professor Lesbouyries, of the Alfort Veterinary College, whose work on poultry diseases is well known. The subjects varied from infectious diseases such as Newcastle disease, salmonellosis and moniliasis in turkeys to artificial insemination, transmisson of antibodies, coccidiosis and fowl paralysis. The papers from this country in this section were:—

" The introduction of Newcastle disease by means of frozen poultry carcases," by N. Dobson and G. B. Simmins.

" Agglutinating and non-agglutinating antibodies to *S. pullorum* in the sera and egg yolks of hens," by A. Buxton.

" Sulphaquinoxaline in the treatment of caecal coccidiosis caused by the coccidium *Eimera tenella* (Railliet and Lucet, 1891)," by C. Horton-Smith.

" Observations on an outbreak of disease in fowls, possibly associated with sulphaquinoxaline poisoning," by R. F. Gordon.

" A possible connection between the Rous I sarcoma virus and fowl paralysis," by A. W. Greenwood and J. G. Carr.

" The causes of epidemic outbreaks of moniliasis in turkeys," by J. D. Blaxland.

" Preservation of fowl spermatoza at low temperatures," by G. Polge.

Some of the subjects gave rise to considerable discussion during which the problems were viewed from different angles. Although some old ground was gone over there was evidence of definite progress in the study of some of the important diseases affecting poultry and their control. Some expression was given, for example, to the need now to standardise methods of diagnosis of disease, pullorum disease (B.W.D.) being specially cited, where it was felt that the time has been reached when it is possible to consider

internationally standards of antigen and methods of technique in the recognition of carrier birds.

In Section 1, of which Dr. A. W. Greenwood was the President, the subjects discussed included the development of new breeds of poultry, the influence of various factors on hatchability, progeny testing, inheritance of factors and qualities, etc.

The papers from this country were:—

"The genetics of the white pile pattern in the domestic fowl," by A. Cock and M. Pease.

"Retarded pigmentation. A recessive gene affecting down colour and pattern," by M. Pease and A. Cock.

"Abnormalities of the heart and great vessels in full-term dead-in-shell embryos," by W. Marshall.

Section 2 was well attended and a large variety of subjects was discussed: they dealt largely with the results of laboratory and field studies on various types of feeding. One of the interesting contributions dealt with the use of antibiotics and the animal protein factor.

The papers from this country were:—

"The nutritive (energy) value of poultry foods," by E. T. Halnan.

"Free and combined riboflavin in the hen's egg," by W. Bolton.

"Antibiotics and the animal protein factor in chick growth," by Messrs. Coates, Dickinson, Harrison, Kon and Mann.

"A comparison of different sources of the animal protein factor in poultry nutrition," by Messrs. Black, Getty, Coates, Harrison and Kon.

"Standards of heating and ventilation for the poultry industry," by C. N. Davies.

"Condensed fish and whale solubles in poultry nutrition," by F. Cumber.

"All-vegetable ration under United Kingdom conditions," by E. J. Carpenter and J. Duckworth.

Section 4 considered economic problems. Quality of poultry and their carcases, quality of eggs, costs, profits, etc., were dealt with. In this section there appeared a paper on "The responsibility of the veterinary profession to the poultry industry." Contributions from this country were:—

"Green yolks," by A. W. Davies.

"A study of the physical quality of eggs produced by pullets in battery cages and a new technique for the estimation of albumen quality," by H. Temperton.

"Some factors determining the international trade in eggs," by S. R. Wragg.

"Chemical caponisation with special reference to the use of hexoestrol," by N. Mc. G. Black and J. Bennett.

In Section 5 the contributions from this country were:—

"Poultry production and progeny trials," by Jim Sutton.

"Training in poultry husbandry in England and Wales," by R. Coles.

"Some economic aspects of commercial egg production under hen battery systems," by Keith Wilson.

"Poultry hatcheries in Northern Ireland," by J. G. Rhynehart.

"Methods of research in poultry," by F. J. Dudley.

T. D.

NOTES AND NEWS

Diary of Events

Sept. 5th.—Meeting of the Editorial Executive 1.30 p.m.; Main Committee, 3 p.m.

Sept. 5th.—Meeting of the Midland Counties Division, N.V.M.A., at Droitwich (Raven Hotel), 2.30 p.m.

Sept. 7th.—Meeting of the Overseas Committee, N.V.M.A., 10.30 a.m.

Sept. 7th.—Meeting of the South Wales Division, N.V.M.A., at Aberystwyth, 11.30 a.m.

Sept. 7th.—Meeting of the Technical Development Committee, N.V.M.A., 2.30 p.m.

Sept. 11th.—Summer Meeting of the East Midlands Division, N.V.M.A., at Thurgarton, Notts. (See Notice.)

Sept. 12th.—Meeting of the North Wales Division, N.V.M.A., at Dolgelley (Golden Lion Hotel), 2 p.m.

Sept. 20th.—Open Field Day at Tean Cattle Breeding Centre, Stoke-on-Trent, Staffs, 2 p.m.

Sept. 23rd-29th.—Sixty-ninth Annual General Meeting and Congress of the National Veterinary Medical Association, at Eastbourne.

Alteration in Date of Meeting

Members of the N.V.M.A. Technical Development Committee are asked to note that the date of the next meeting has been brought forward from September 11th to *Friday, September 7th* (2.30 p.m.)

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N.V.M.A. Congress at Eastbourne

Application for Tickets

Members are asked to note that ticket application forms for attendance at the forthcoming Congress of the Association were included in the August 4th issue of *The Veterinary Record*. As indicated at the top of the form, applications should have been received by the General Secretary before to-day's date, and any member who has omitted to see to this is urgently requested to complete and return the form at once.

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Arrangements at Slaughterhouses for Dealing with Casualty Animals

The Association is interested in collecting information on various ways in which meat—which might otherwise be suitable for human consumption—is being lost to the country.

It is known that livestock owners, on occasion, send "casualty" animals to the knacker for slaughter because of difficulties experienced in arranging for slaughter through the Ministry of Food or by a private slaughterman. Furthermore, such an owner may receive a better price from the knacker than from the Ministry of Food, which pays only for that part of a carcase suitable for human consumption.

The Association would therefore welcome any evidence bearing on this matter, particularly in rural areas, and members are asked to send any particulars they may have as soon as possible to the General Secretary, N.V.M.A., 36, Gordon Square, London, W.C.1.

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Statement *re Pre-Partum* Milking

As already announced, Council, N.V.M.A., has approved for publication the following statement on *pre-partum* milking.

Certain antibodies, globulins and vitamins occur in greater concentration in the colostrum than in the milk of cows, and the importance of some of these substances in aiding calves to resist various disease conditions is well established.

Accordingly, any system of milking which causes the cow to secrete milk instead of colostrum at the time of calving should be deprecated; nevertheless, when cows are "steamed up" before calving, there may be, in some cases, a justification for relieving the tension on the udder by moderate *pre-partum* milking of the cow.

It is the opinion of the Association that this practice should not be employed extensively or for prolonged periods. It should be confined to animals in which there is exceptional *pre-partum* tension in the udder, causing some discomfort to the animal, and possibly adversely affecting the subsequent milk yield if some of the tension were not reduced.

The Register of Veterinary Surgeons and Supplementary Veterinary Register for 1951

Difficulties experienced by the printers in the delivery of newsprint have caused an unavoidable delay in the publication of the Register for 1951 which is now being issued by the printers to all members of the Royal College who have paid the current year's Annual Fee.

The following figures may be of interest:—

The number of names appearing on the Register of Veterinary Surgeons has increased from 4,929 to 5,157, eleven names are entered on the Commonwealth List, and Veterinary Practitioners on the Supplementary Register now number 299.

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R.C.V.S. OBITUARY

CLARKSON, Marmaduke, J.P., Satron, Richmond, Yorks. Graduated Edinburgh, May 22nd, 1888. Died August 14th, 1951; aged 83 years.

DRINKWATER, Frank, Major late R.A.V.C. (T.A.), 26, Victoria Drive, West Kirby, Cheshire. Graduated Edinburgh, May 23rd, 1905. Died April 30th, 1951. (Intimation just received).

KEALL, Thomas John, F.R.C.V.S., Slenmont, Saxilby, Lincoln. Graduated Edinburgh, May 22nd, 1901; Fellowship May 4th, 1910. Died August 23rd, 1951; aged 76 years.

KEARNEY, William, M.A. (T.C.D.), M.V.SC. (N.U.I.), M.R.C.V.S., Capt. late E.A.V.C., Professor of Pathology, Veterinary College of Ireland, Ballsbridge, Dublin. Graduated Edinburgh August 15th, 1912. Died August 19th, 1951; aged 60 years.

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Professor William Kearney

We record above, with the deepest regret, the death of Professor William Kearney, who passed away in the Bon Secour Nursing Home, Cork, where he had been since May last, on Sunday, August 19th.

Pending the publication of a memoir in an early issue, it should now be recalled that Professor Kearney, who was a native of West Cork, after a distinguished collegiate career, spent some years on earlier research work in Africa, with a break for service with the E.A.V.C. during the 1914-18 war, before appointment as Veterinary Pathologist to the Government of Nigeria, from 1924-1928. In the latter year he was appointed Professor of Pathology and Bacteriology in the Veterinary College of Ireland. Professor Kearney was a Past President of the Veterinary Council of Eire and a member of the Council at the time of his death; also a member of Council of the V.M.A. of Ireland, and of the Scientific Committee of the Royal Dublin Society.

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Mr. Marmaduke Clarkson, J.P.

Mr. Marmaduke Clarkson, after qualifying at Edinburgh, spent a few years in practice in the midlands and then returned to the Dales, to serve a farming community which knew the family well, for his father had a druggist's business in Reeth.

From his early years he was an active member of the Methodist Church, first as a teacher, and later as superintendent of the Sunday School at Reeth. He was also a circuit steward, and was often called upon to preside at meetings in connection with the chapels in the circuit.

For some time he had charge of Barclays Bank at Reeth. He was a Justice of the Peace of the North Riding. Some years ago he took up his residence at Satron with his sister, Miss A. Clarkson, who survives him, and continued his veterinary practice until the end of the second world war.

Mr. Clarkson was a staunch supporter of various organisations in Upper Swaledale and in the Reeth district, including the Swaledale (Muker) and Reeth Agricultural Shows. He was a trustee and vice-president of the Reeth Literary Institute.

"By his death," says *The Darlington & Stockton Times*, "Swaledale has lost one of its most honoured and beloved sons, whose kindly and gentle nature, coupled with his high Christian character, made him respected by all who knew him."

PERSONAL

A Colourful and Useful Veterinary Career

A very interesting member of our profession, Mr. Richard Clarke Glover, V.D., has recently paid a short visit to this country. In a very full life he has spent less than a year in the old country during the last 45 years having always been too busy while engaged in his professional activities in various parts of the world.

His father, winner of the Fitzwygram prize in 1887, was a contemporary of Dr. A. L. Sheather's father and of three members of the Sewell family, all of them also London practitioners and all men who rose to the top of their profession.

Mr. R. C. Glover started at the Royal Veterinary College in 1899 He joined the R.A.M.C. as a volunteer when the South African War broke out. At the end of the war he returned to the College and he qualified in 1904.

After a time spent in practice with Spooner-Hart in Calcutta he moved on to Rangoon and remained there in practice until the Japanese invaded the country in 1941, with a break while he served in the R.A.V.C. in the 1914-18 war, during which he was in France. He was bombed and injured during the early Japanese attacks on Burma and was evacuated to India as a casualty.

Again he "joined up." As there were no vacancies in the R.A.V.C. at the time he became a combatant officer in the 16th Punjabis. Later when there was a call for veterinary officers he again joined the corps and commanded the well-known Mona Remount Depot in the Punjab.

He has always been a keen volunteer, dating back to college days. In Burma he held a commission in the Rangoon Infantry and later transferred to the Rangoon Light Horse of which he finally held command.

During the last three years Mr. Glover has served as a veterinary officer in Jamaica and has now returned there after a short period of leave.

His career is a fine example of the breadth of interest available in veterinary life. There cannot be very many civilians with service in three wars to their credit, coupled with a very full life covering many activities outside the purely professional work.

We are very glad to have had the opportunity to meet Mr. Glover and commend his enthusiasm. His physical fitness, activity and keenness, which would shame many a man of half his age, are astonishing in one who has served in the Forces under every British Monarch from the time of Queen Victoria. He has upheld the prestige of his profession in very wide and important circles.

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Appointment.—Mr. Thomas J. Egan, M.R.C.V.S., late I.V.S. and Director, Animal Husbandry Department, United Provinces, Lucknow, India, has been appointed Animal Husbandry Adviser to the Middle East Office, Cairo, as from August 24th, 1951.

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Forthcoming Marriage.—OWEN—STRINGER.—The engagement is announced between Laurence N. Owen, B.V.SC., M.R.C.V.S., son of the late Mr. R. D. Owen and of Mrs. F. Owen, Crappenhall, Warrington, and Barbara Stringer, eldest daughter of Mr. and Mrs. F. Stringer, of Crappenhall, Warrington.

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R.C.V.S. CENTRAL LIBRARY FOR ANIMAL DISEASES

Accessions for the Quarter Ending May 31st, 1951

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE. Brucellosis. A symposium under the joint auspices of National Institutes of Health of the Public Health Service, Federal Security Agency and others, Washington, A.A.A.S., 1950.

ANDERSON, A. L. Swine management, including breeding and feeding. Chicago: J. B. Lippincott Company, 1950.

FARRIS, E. J., *Editor.* The care and breeding of laboratory animals. New York: John Wiley & Sons, 1950.

FIEBIGER, J. Die tierischen Parasiten. Wien: Urban & Schwarzenberg, 1947.

FISHER, R. A. Statistical methods for research workers. *Eleventh edition.* Edinburgh: Oliver & Boyd, 1950.

HAGEDOORN, A. L. Animal breeding. *Fourth edition.* London: Crosby Lockwood & Son Ltd., 1950.

KIRK, H. Index of treatment in small-animal practice. *Second edition.* London: Baillière, Tindall & Cox, 1951.

KITT, T. Lehrbuch der Allgemeinen Pathologie für Tierärzte und studierende der Tiermedizin. *Seventh edition.* Stuttgart: Ferdinand Enke, 1950.

LEWIS & Co. LTD, H. K. Catalogue of Lewis's Medical, Scientific and Technical Lending Library. *New edition* revised to December, 1949. London: H. K. Lewis & Co. Ltd., 1950. 17s. 6d. (*For reference in the Library only.*)

Manson, E. The law relating to dogs. London: William Clowes & Sons Ltd., 1893.

Merchant, I. A. Veterinary bacteriology and virology. *Fourth edition.* Ames: Iowa State College Press, 1950.

Nielsen, A. L. Perosis en knoglesygdom hos hons. Kjobenhavn: Nyt Nordisk, 1942.

Schall, W. E. X-rays: their origin, dosage and practical application. *Sixth edition.* Bristol: J. Wright & Sons Ltd., 1947.

Winge, O. Inheritance in dogs, with special reference to hunting breeds. New York: Comstock Publishing Company, 1950.

Wirth, D. Grundlagen einer klinischen Hämatologie der Haustiere. *Second edition.* Wien: Urban & Schwarzenberg, 1950.

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ADDRESSES OF DISEASE-INFECTED PREMISES

The list given below indicates, first, the county in which are situated the premises on which disease has been confirmed, followed by the postal address and date of outbreak.

Foot-and-mouth Disease:

Cumberland.—Annfield, Cockermouth, Cumberland (Aug. 20th).

Swine Fever:

Bucks.—Savoy Farm, Denham (Aug. 22nd).

Cambs.—The Anchor Inn, Bottisham; Chiswick Farm, Meldreth, Royston (Aug. 21st); Pound Lane, Isleham (Aug. 22nd).

Cornwall.—Coads Green, Launceston (Aug. 22nd).

Denbigh.—Tanybwlch Farm, Bwlchgwyn (Aug. 20th); Bryneithin, Glyncerrig, Wrexham (Aug. 25th).

Derbys.—20, Main Street, Overseal, Burton-on-Trent (Aug. 20th); Vine Cottage, Barrow-on-Trent (Aug. 24th).

Durham.—Rodridge Hall Farm, Hutton Henry (Aug. 20th); Forge Allotments, North Road, Darlington (Aug. 22nd); Lizard Farm, Winterton, Sedgefield (Aug. 25th).

Essex.—The Poplars, Ongar Road, Epping (Aug. 25th)'

Hunts.—Mill Farm, Somersham (Aug. 22nd).

I. of Ely.—Sewards Farm, Chatteris; 106, Stanold Road, Whittlesey; The Hollies, Upwell, Wisbech (Aug. 20th); 64, New Road, Whittlesey; 41, Stonald Road, Whittlesey (Aug. 21st); Old Halves Farm, Somersham Road, Chatteris (Aug. 22nd); Dock Road, and 94, High Street, Chatteris (Aug. 23rd).

Kent.—123, Canterbury Road, Sittingbourne (Aug. 25th).

Lanarks.—Easter Cadder Farm, Bishopbrigg (Aug. 24th).

Lancs.—Linney Lane Piggeries, Linney Lane, Shaw (Aug. 21st).

Lincs. (*Kesteven*).—13, Council House, Waddington (Aug. 20th).

Lincs. (*Lindsey*).—Dutch House Farm, Asterley, Louth (Aug. 21st).

Norfolk.—Lord Nelson Inn Piggery, East Dereham; Ostrich Public House, Tittleshall, King's Lynn; Burrett Road, Walsoken; 1, Bungalow, West Tofts, Thetford (Aug. 20th); Park Farm, Longham, E. Dereham (Aug. 23rd); The Stores, Clint Green, Yaxham (Aug. 21st).

Northants.—Melton Works, Brook Street, E. Wellingborough (Aug. 25th).

Oxford.—Old Vicarage, Caversfield, Bicester (Aug. 21st).

Staffs.—Navigation Road, Burslem (Aug. 22nd); 203, Nag Hill, Rugeley Road, Burntwood, Lichfield (Aug. 24th).

Suffolk (*W.*).—Lynton Farm, Beck Row, Bury St. Edmunds (Aug. 20th); Wadgell's Farm, Sowley Green, Gt. Thurlow (Aug. 23rd); Ketton Hall, Kedington (Aug. 25th).

Warwicks.—1, Napton Road, Stockton, Rugby (Aug. 20th); 4, Small Holdings, Bassington, Coventry; 2408, Stratford Road, Hockley Heath, Birmingham (Aug. 20th); Wildmore, Alcester Road, Stratford-on-Avon (Aug. 25th).

Yorks (*E.R.*).—Rose Tree Farm, Holme-on-Spalding-Moor (Aug. 25th).

Yorks (*N.R.*).—Sandwath Farm, and Forcett Barns, Forcett, Richmond (Aug. 20th); Castle Howard Farm School, and Cricket Field Piggeries (Aug. 23rd); Castle Farm, High Street, Slingsby (Aug. 25th).

Yorks (*W.R.*).—Harrogate Road, Rawdon (Aug. 20th); The Croft, Hedleys, Leeds Road, Newton Hill, Wakefield; Half Acres, Bolton Road, Silsden: Piggeries at Jubilee Gardens Parkside Road, Bradford; Bank Lane Allotments, Rossington, Doncaster; 21, Brown Lane Allotments, Holbeck, Leeds, 11; Penny Close Farm, 38, Odsal Road, Bradford (Aug. 23rd).

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UNIVERSITY OF LONDON EXAMINATIONS IN VETERINARY SCIENCE

Following is the Pass List for the Second Examination in Veterinary Science, University of London, July, 1951: Biggs, Peter Martin; Clay, Daniel, Fell, Bernard Francis; Lane, Denis Richard and Malone, James Carruthers, all of the Royal Veterinary College.

The following student has qualified for registration for Ph.D.: Brundritt, Eileen, also of the Royal Veterinary College.

A nation-wide programme for expanding agricultural production in India which includes the provision of 60,000 stud bulls a year has been drawn up by the Indian Minister of Food, Mr. K. M. Munshi.

CORRESPONDENCE

The views expressed in letters addressed to the Editor represent the personal opinions of the writer only and their publication does not imply endorsement by the N.V.M.A.

TREATMENT OF ANIMALS BY PSYCHOLOGICAL ADJUSTMENT

Sir,—Racing greyhounds and bloodstock constitute two outstanding groups of valuable livestock in which certain conditions of health, conduct and temperament prove unresponsive to the best physical treatment and schooling. There is a psychological approach to adjustment of such intractable defects, which involve very heavy losses on all connected with the animals concerned.

It was decided to seek the cure of such unresponsive conditions by promoting changes in the involuntary activities—the functioning of the bodily organs, and the habitual actions of the mind and temperament—and it has been found that desired conduct or performance may be induced by inspiring impulses, in the nervous system, that arise when the idea of that conduct is made involuntary in the mind.

To treat animal patients, the practitioner sets up the appropriate impulses in his own nervous system and, in the course of treatment, transfers these to the nervous system of his patient. Treatment consists of a series of half hour occasions during which, by transfer of impulses from the practitioner to the patient, the new impulses, that secure the desired adjustment, are substituted for the former impulses that had been supporting the adverse conditions it is sought to relieve. In quiet surroundings, the practitioner places his hand gently on a suitable contact point with the nervous system of the patient, such as the neck, withers or stomach. This is the only physical contact he needs with his patient.

By this procedure, adverse impulses are relieved, painlessly and pleasantly, and satisfactory impulses substituted concerning bodily functioning and mental and temperamental activity and conduct. Corresponding conditions are developed and cure effected. Change is made at source, in the very nature of the impulse that inspires the activity concerned, that is to say, at a point much earlier than that at which physical treatment or schooling can be applied to the consequences of these impulses when made manifest in physical condition and behaviour. A wide range of physical and temperamental defects and adverse conduct has been treated successfully in greyhounds and horses. Data of these results have been placed before the Editorial Committee of this journal. Report of a demonstration case appeared in "*Horse and Hound*" of the 3rd March last, at page 21, and references to such cases occur in my article on "Temperamental Performers" in the *Sporting Life* of the 29th November, 1948.—Yours faithfully, Charles Brook, 8, Harley Street, London, W.1. *August 20th, 1951.*

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RESISTANCE OF WEEVILS TO DDT

Sir,—I had delivered to me recently a bag of biscuit meal, which was later found to be infested with weevils. The bag was not returned, as by this time the weevils had begun to spread to adjacent bags; instead, the food store was fumigated with a DDT smoke canister of more than adequate strength. Twelve hours later the weevils were still alive, so the fumigation was repeated the following night. This also appeared to make no difference, therefore two jam jars were prepared, one containing biscuit meal, the other containing half biscuit meal and half dispersable DDT powder with 37 per cent. DDT, making an approximate overall concentration of 18½ per cent. of DDT. In either jam jar—probably due to the previous fumigation—flies show symptoms of DDT poisoning in a few minutes and die in three-quarters of an hour, but the weevils are still alive and appear to be gaining in strength after nine days.

If anyone would like a supply of these remarkable insects for further research, and will send me a suitable container, I shall be only too pleased to return it full.—Yours faithfully, W. J. Tarver. 39, Beech Grove, Ashton-on-Ribble, Preston, Lancs. *August 21st.* 1951.

[So far as we are able to ascertain, no such marked resistance to DDT is known among the several species of grain weevil. In general, they do not show the great sensitivity manifested by house flies but a 3 per cent. admixture of DDT powder should be enough to kill them.—*Editor.*]